

Xcellon-Multis® Reduced 40GE Load Modules

Evolve Your Higher Speed Ethernet Testing

As bandwidth requirements press the limits of networking devices, equipment manufacturers must keep pace by introducing even higher-density 10GE and 40GE gear. Xcellon-Multis is Ixia's next-generation architecture and test solution to satisfy a wide range of testing needs. As service providers and large enterprises implement this same equipment in their own networks, they must also test and verify performance and functionality prior to deployment.

Ixia's Xcellon-Multis load module family comprises the industry's highest-density 10GE and 40GE higher speed Ethernet (HSE) test equipment, providing more flexible test coverage for high-density test requirements. These ultra-dense load modules bring a higher return on investment by reducing overall costs associated with product licensing, space, power, and cooling.

The Xcellon-Multis Reduced 40GE load modules offer industry-leading high-density, cost-effective, and flexible 40GE capability for testing next-generation multi-terabit networks. Used in conjunction with Ixia applications, the user can quickly and accurately assess the performance and reliability of network equipment and solutions before they are deployed.

Key Features

- Highest-density test module in the industry
- Xcellon-Multis Reduced 40GE offers up to 12-ports of 40GE interfaces in a single chassis slot
 - Up to 120 native 40GE interfaces are supported in Ixia's rackmount chassis

Highlights

- Do more with less:
 - Less cabling, power, cooling, total cost of ownership, rack space, licensing
 - More ports, bandwidth, flexibility, capability, horsepower
- Cost effective: reduces total cost of ownership with more ports in a single chassis; 120x40GE ports with fan-out-enabled technology
- Usability: a broad feature-set that is common with Xcellon-Multis Reduced 10GE and 10/40GE load modules
- Low-to-mid-range L2-3 protocol scale and performance testing for routing/switching and data center test cases



Xcellon-Multis Reduced 1-slot, 12-port load module

- Xcellon-Multis Reduced 40GE load module models:
 - XMR40GE12QSFP+: A 12-port module for 40GE operation only
 - XMR40GE6QSFP+: A 6-port module for 40GE operation only
- Multiple media support
 - 40GBASE-SR4 (multimode) optical transceivers
 - 40GBASE-LR4 (single mode) optical transceivers
 - 40GBASE-CR4 QSFP+ Direct Attached Cable (DAC) for passive copper, point-to-point media up to 3 meters in length
- Layers 2-3 coverage
- Supports low-to-mid-range protocol scale and performance testing for L2-3 routing/switching and data center test cases of up to 100 routing protocol sessions and up to 2,000 broadband access emulation sessions per port
 - Common L2-3 protocol coverage with Xcellon-Multis CXP 40GE interfaces
 - Same feature set across all speeds
 - Common data plane features are provided for 40GE testing as in other Xcellon-Multis 40GE load modules
- The highest ROI of any test and measurement load module
 - Density – industry’s highest 40GE port density
 - Versatility – multiple speeds, multiple interfaces
 - Balanced performance and scale
 - Greater test case coverage
 - Industry-standard fan-out technology

Specifications

Model Name	XMR40GE12QSFP+	XMR40GE6QSFP+
Part number	944-1114	944-1115
Hardware Load Module Specifications		
Slot / number of ports	1-slot: • 12x40GE ports	1-slot: • 6x40GE ports
Physical interfaces	QSFP 12x40GE (native)	QSFP 6x40GE (native)
Chassis Capacity: Maximum Number of Cards and Ports per Chassis Model		
XGS12-SD Chassis: (940-0011)	10 load modules: • 120-ports of 40GE	10 load modules: • 60-ports of 40GE
XGS12-SDL Chassis: (940-0015)	10 load modules: • 120-ports of 40GE	10 load modules: • 60-ports of 40GE

Model Name	XMR40GE12QSFP+	XMR40GE6QSFP+
XGS12-HSL Chassis (940-0016)	10 load modules: • 120-ports of 40GE	10 load modules: • 60-ports of 40GE
XGS2-SD Chassis (940-0010)	2 load modules: • 24-ports of 40GE	2 load modules: • 12-ports of 40GE
XGS2-SDL Chassis (940-0013)	2 load modules: • 24-ports of 40GE	2 load modules: • 12-ports of 40GE
XGS2-HSL Chassis (940-0014)	2 load modules: • 24-ports of 40GE	2 load modules: • 12-ports of 40GE
CPU and memory	Multicore processors with 4GB of memory per processor	
IEEE interface protocols	<ul style="list-style-type: none"> • 40GBASE-SR4 (802.3ba-2010) • 40GBASE-LR4 (802.3ba-2010) • 40GBASE-CR4 (802.3ba-2010) 	
Transceiver support	QSFP+: <ul style="list-style-type: none"> • 40GBASE-SR4 (multimode 850nm) • 40GBASE-LR4 (single mode 1310nm)ⁱⁱ 	
Cable media	<ul style="list-style-type: none"> • 40GBASE-CR4 QSFP+ DAC passive copper, point-to-point up to 3 meters in length 	
Operating temperature range	41°F to 95°F (5°C to 35°C), ambient air 0% to 85%, non-condensing	
Load module dimensions	16.8" (L) x 1.3" (W) x 12.0" (H) 427mm (L) x 33mm (W) x 305mm (H)	
Load module weights	12-port model: <ul style="list-style-type: none"> • Module only: 12.5 lbs. (5.67 kg) • Shipping: 16.2 lbs. (7.35 kg) 6-port model: <ul style="list-style-type: none"> • Module only: 9.3 lbs. (4.22 kg) • Shipping: 13.1 lbs. (5.94 kg) 	
Transmit Feature Specifications		
Transmit engine	Wire-speed packet generation with timestamps, sequence numbers, data integrity signature, and packet group signatures	
Max. streams per port	40GE mode: 32	

Model Name	XMR40GE12QSFP+	XMR40GE6QSFP+
Max. streams per port in data center Ethernet	40GE mode: 32	
Stream controls	Rate and frame size change on the fly, sequential and advanced stream scheduler	
Minimum frame size	40GE: <ul style="list-style-type: none"> • 64 bytes (line rate) • 49 bytes (< line rate) 	
Maximum frame size	14,000 bytes	
Maximum frame size in data center Ethernet	9,216 bytes	
Priority flow control	8 line-rate-capable queues with each supporting up to 2,500 byte frame lengths 1 queue supporting up to 9,216 byte frame length	
Frame length controls	Fixed, increment by user-defined step, weighted pairs, uniform, repeatable random, IMIX, and Quad Gaussian	
User defined fields (UDF):	Fixed, increment or decrement by user-defined step, sequence, value list, and random configurations. Up to ten, 32-bit wide UDFs are available.	
Value lists (max.)	40GE: 1 million / UDF	
Sequence (max.)	40GE: 128K / UDF	
Error generation	Generate good CRC or force bad CRC, undersize and oversize standard Ethernet frame lengths, and bad checksum	
Hardware checksum generation	Checksum generation and verification for IPv4, IP over IP, IGMP/GRE/TCP/UDP, L2TP, GTP	
Link fault signaling	Reports, no fault, remote fault, and local fault port statistics	
Latency measurement resolution	40GE: 2.5 nanoseconds	
Intrinsic latency compensation	Removes inherent latency error from the port electronics	
Transmit line clock adjustment	Ability to adjust the parts per million line frequency over a range of -100 ppm to +100 ppm per resource group	

Model Name	XMR40GE12QSFP+	XMR40GE6QSFP+
Receive Feature Specifications		
Receive engine	Wire-speed packet filtering, capturing, real-time latency and inter-arrival time for each packet group, with data integrity, sequence, and advanced sequence checking capability	
Trackable receive flows per port	40GE: 128K	
Minimum frame size	64 bytes at line rate ≥ 49 bytes not a line rate	
Filters (user-defined statistics, UDS)	2 SA/DA pattern matchers, 2x16-byte user-definable patterns with offsets capability for start of: frame, IP, or protocol; Up to 6 UDS counters are available	
Hardware capture buffer per port or resource group	40GE: 2GB per 1, user-selected port/resource group	
Statistics and rates	Link state, line speed, frames sent, valid frames received, bytes sent/received, fragments, undersize, oversize, CRC errors, VLAN tagged frames, 6 user-defined stats, capture trigger (UDS 3), capture filter (UDS 4), 8 QoS counters, data integrity frames, data integrity errors, sequence and advanced sequence checking frames, sequence checking errors, ARP, and PING requests and replies	
PCS lanes port statistics (40GE mode only)	PCS Sync Errors, Illegal Codes, Remote Faults, Local Faults, Illegal Ordered Set, Illegal Idle, Illegal SOF, Out Of Order SOF, Out Of Order EOF, Out Of Order Data, Out Of Order Ordered Set	
Latency/jitter measurements	Cut-through, store & forward, forwarding delay, up to 16 time bins latency/jitter, MEF jitter, and inter-arrival time	

Layer 2-3 Protocol Support	
L2/3 routing, bridging, and timing	<p>Routing: RIP, RIPng, OSPFv2/v3, ISISv4/v6, EIGRP, EIGRPv6, BGP/BGP+</p> <p>MPLS: RSVP-TE, RSVP-TE P2MP, LDP, mLDP, BGP RFC 3107, MPLS-TP, MPLS OAM</p> <p>MPLS VPN: L2VPN PW, L3VPN/6VPE, 6PE , VPLS-LDP, VPLS-BGP, VPLS-BGP AD and LDP FEC 129, Inter-AS VPN Option A, B, and C, Seamless MPLS, Carrier Supporting Carrier (CsC), GRE mVPN, NG mVPN (mLDP and RSVP-TE P2MP), EVPN/PBB-EVPN</p> <p>High-Availability: BFD, Graceful Restart, MPLS Ping/TraceRoute, LSP BFD, VCCV BFD, Real-time dynamic label swap for convergence time measurement up to millisecond accuracy</p> <p>IP Multicast: IGMPv1/v2/v3, MLDv1/v2, PIM-SM/SSM, PIM-BSR, multicast VPN</p> <p>Switching: STP/RSTP, MSTP, PVST+/RPVST+, LACP, LLDP, Protocols over LACP Bundle</p> <p>Carrier Ethernet: Link OAM, CFM, Service OAM, PBT/PBB-TE, SyncE, PTP (1588v2), E-LMI</p>
Data center Ethernet	<p>Priority Class-Based Flow Control (IEEE802.1Qbb), FCoE/ FIP, LLDP/DCBX, VNTAG/VIC, OpenFlow, FabricPath, TRILL, SPBM, VEPA, VXLAN</p>
Broadband access	<p>Broadband: ANCP, PPPoX, DHCPv4 client/server, DHCPv6 client/server, L2TPv2, Radius Attributes for L2TP, Dual-Stack PPPoX, AMT</p> <p>Authentication: 802.1x, WebAuth, Cisco NAC</p>

Application Support

Xcellon-Multis Load Modules
<ul style="list-style-type: none"> • IxNetwork: Provides wire-rate traffic generation with service modeling that builds realistic, dynamically-controllable data-plane traffic. IxNetwork offers the industry's best test solution for functional and performance testing by using comprehensive emulation for routing, switching, MPLS, IP multicast, broadband, authentication, Carrier Ethernet, and data center Ethernet protocols. • IxExplorer: Layer 2-3 wire-speed traffic generation and analysis. • Tcl API: Custom user script development for layer 1-3 testing.

Ordering Information

Load modules

944-1114

Xcellon-Multis XMR40GE12QSFP+ 40-Gigabit Ethernet QSFP+ Reduced load module, 1-slot with 12-ports of 40GE QSFP+, full featured L1-3 data plane support and up to 100 routing protocol emulations per port. The load module is compatible with the XGS2-SD 2-slot, 3RU standard performance rack-mountable chassis bundle (940-0010), XGS12-SD 12-slot, 11RU standard performance rack-mountable chassis bundle (940-0011), XGS2-SDL 2-slot, 3RU standard performance rack-mountable chassis bundle (940-0013), XGS12-SDL 12-slot, 11RU standard performance rack-mountable chassis bundle (940-0015), XGS2-HSL 2-slot, 3RU high performance rack-mountable chassis bundle (940-0014), and XGS12-HSL 12-slot, 11RU high performance rack-mountable chassis bundle (940-0016).

REQUIRES purchase of one or more QSFP+ 40GBASE-SR4 optical transceivers (948-0031) and MT 12-fiber MMF cable, 3-meter length (942-0041), or QSFP+ 40GE, 40GBASE-LR4, single mode fiber optical transceiver (948-0032). All media listed are available from Ixia.



944-1115

Xcellon-Multis XMR40GE6QSFP+ 40-Gigabit Ethernet QSFP+ Reduced load module, 1-slot with 6-ports of 40GE QSFP+, full featured L1-3 data plane support and up to 100 routing protocol emulations per port. The load module is compatible with the XGS2-SD 2-slot, 3RU standard performance rack-mountable chassis bundle (940-0010), XGS12-SD 12-slot, 11RU standard performance rack-mountable chassis bundle (940-0011), XGS2-SDL 2-slot, 3RU standard performance rack-mountable chassis bundle (940-0013), XGS12-SDL 12-slot, 11RU standard performance rack-mountable chassis bundle (940-0015), XGS2-HSL 2-slot, 3RU high performance rack-mountable chassis bundle (940-0014), and XGS12-HSL 12-slot, 11RU high performance rack-mountable chassis bundle (940-0016).

REQUIRES purchase of one or more QSFP+ 40GBASE-SR4 optical transceivers (948-0031) and MT 12-fiber MMF cable, 3-meter length (942-0041), or QSFP+ 40GE, 40GBASE-LR4, single mode fiber optical transceiver (948-0032). All media listed are available from Ixia.



Transceivers and cables

QSFP Transceiver

948-0031

QSFP+ 40GE, 40GBASE-SR4 optical transceiver, pluggable, MMF, 850nm. This transceiver is compatible with the following Ixia load modules and CFP-to-QSFP interface adapters: Xcellon-Multis XM10/40GE12QSFP+FAN 40-Gigabit Ethernet QSFP load module (944-1105), Xcellon-Multis XM10/40GE6QSFP+FAN 40-Gigabit Ethernet QSFP load module (944-1109), Xcellon Flex10G/40GSQ 10/40 Gigabit Ethernet Accelerated Performance load module (944-1062), Xcellon-FlexFE40G4Q 40 Gigabit Ethernet Full Emulation load module (944-1065), HSE40GEQSFP1-01, 40-Gigabit Ethernet load module (944-0092). CFP-to-QSFP+ Interface Adapter, 1-port (948-0022), and the CFP-to-QSFP Dual Interface Adapter, 2-port (948-0023).



948-0032ii

QSFP+ 40GE, 40GBASE-LR4, optical transceiver, pluggable, SMF, 1310nm. This is compatible with the following Ixia load modules: Xcellon-FlexAP10/4016SQ 10/40 Gigabit Ethernet Accelerated Performance load module (944-1062), Xcellon-FlexFE40G4Q 40 Gigabit Ethernet Full Emulation load module (944-1065), Xcellon-Multis XM10/40GE12QSFP+FAN 40-Gigabit Ethernet QSFP load module (944-1105), and Xcellon-Multis XM10/40GE6QSFP+FAN 40-Gigabit Ethernet QSFP (944-1109). See endnote IV of this document.



Fiber Optic Cables (point-to-point and fan-out)

948-0025

QSFP+ 40GBASE-SR4 40GE active optical parallel fiber cable assembly, OM3 multimode fiber, 850nm, 3-meter length. For use with the following load modules: Xcellon-Multis XMR10GE32SFP+FAN 40-Gigabit Ethernet QSFP load module (944-1105), Xcellon-Multis XMR10GE16SFP+FAN 40-Gigabit Ethernet QSFP load module, Xcellon-FlexAP1040SQ load module QSFP+ ports (944-1062), Xcellon-FlexFE40G4Q QSFP+ load module (944-1065), HSE40GEQSFP1-01, 40GE QSFP+ load module (944-0092), and CFP adapters; CFP-to-QSFP+ Interface Adapter Module (948-0022), and CFP-to-QSFP+ Dual-Port Interface Adapter Module (948-0023).



942-0071

QSFP-to-QSFP 40GE 40GBASE-CR4 Direct Attach Cable (DAC), passive copper, point-to-point cable, 3-meter length. This cable is compatible with these load modules: Xcellon-Multis XMR10GE32SFP+FAN 40-Gigabit Ethernet QSFP (944-1105) and Xcellon-Multis XMR10GE16SFP+FAN 40-Gigabit Ethernet QSFP (944-1109).



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- i The Xcellon-Multis load modules may not be placed into slots 1 and 12 of the XGS12-HSL, XGS12-SD, and XGS12-SDL chassis. Please consult your factory sales representative for further information.
 - ii Due to increased power consumption of single-mode fiber QSFP-LR4 (40GBASE-LR4) optical transceivers, a maximum of three may be installed in a load module at one time. Active ports for the XMR40GE12QSFP+ (944-1114) are ports 10, 11, and 12. Active ports for the XMR40GE6QSFP+ (944-1115) are ports 4, 5, and 6. For both models, the remaining ports may still have 40GBASE-SR4 transceivers installed while the three each 40GBASE-LR4 transceivers are also installed at the same time.

Learn more at: www.keysight.com

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